

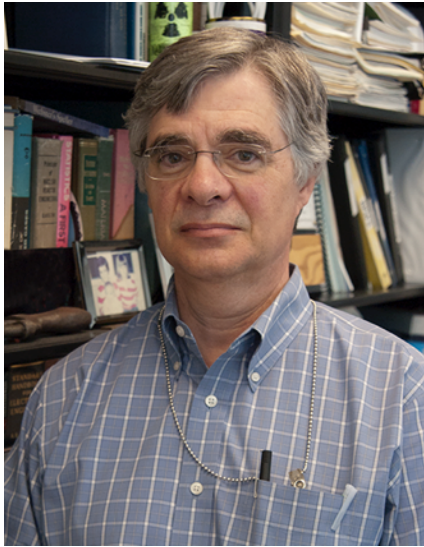
APS Operations: Status and Update

George Srajer

APSUO/PUC Meeting
September 17, 2014



AES Staffing Changes Effective September 1



William Ruzicka



John Maclean



Richard Farnsworth



Ken Sidorowicz

- William Ruzicka moved to a new role handling special projects
- John Maclean became interim AES division director
- Richard Farnsworth and Ken Sidorowicz assumed additional duties within AES Computing Systems
 - Ken: Information Solutions and Software Services Groups
 - Richard : Beamline Control and Data Acquisition



AES Staffing Changes Effective October 1



Leonard Morrison

- Leonard Morrison new Group Leader of the Mechanical Operations and Maintenance (MOM) Group
- B.S. in Mechanical Engineering from Illinois Institute of Technology, Chicago, IL.
- Leonard succeeds George Goeppner who retired in May, 2014
- Many thanks go to Eugene Swetin for filling in as interim group leader during the transition period.

Operations Summary

For 2014-2 Run (Ended Aug. 26):

- Mean Time Between Faults (MTBF): 69.3 hours
- Availability: 97.56%
- *25 total faults*

FY14 To Date:

- MTBF: 121.9 hrs
- Availability: 98.3%

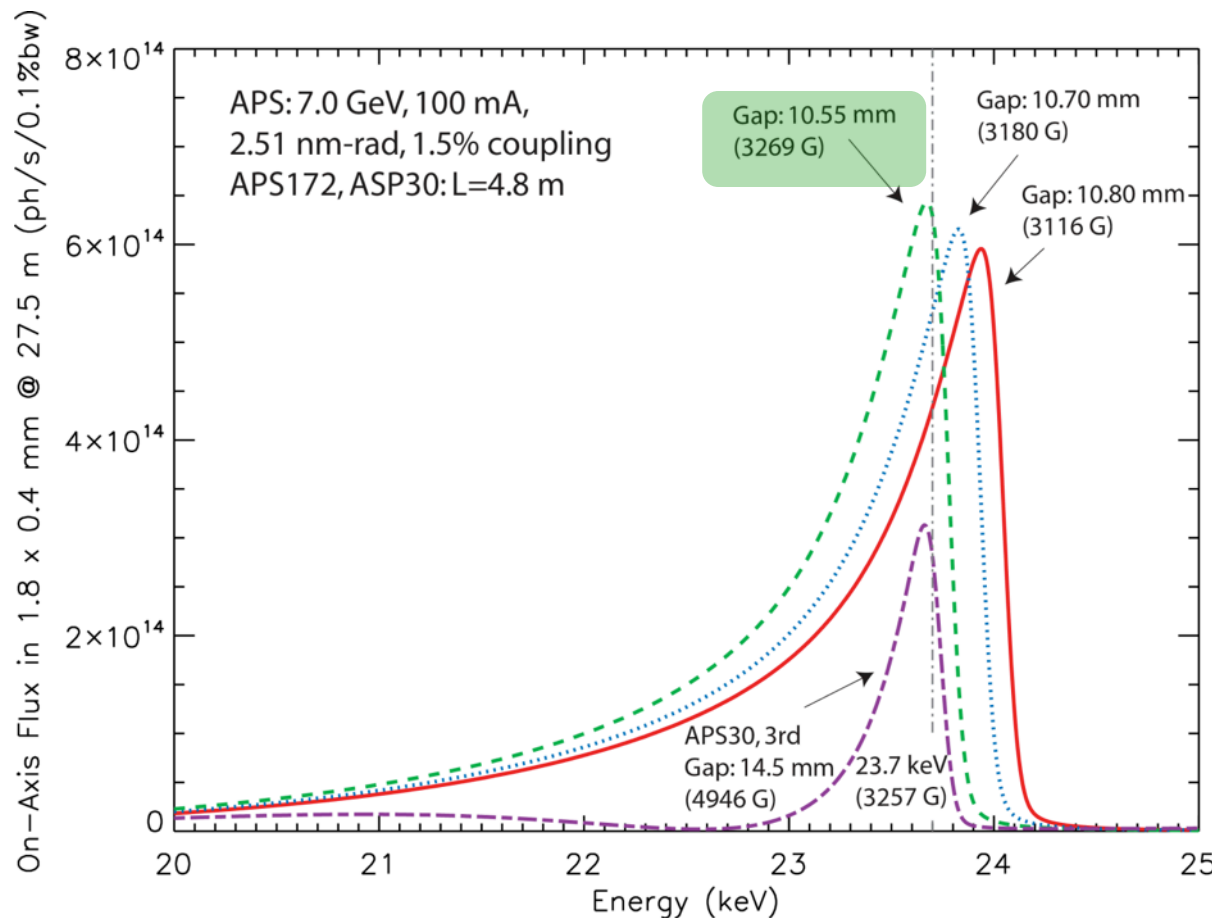
Last 3 years:

- FY11-13 MTBF: 128.8 hours
- FY11-13 Availability: 98.5%



Proactive accelerator team and robust QA program continue to deliver outstanding performance

Successful Installation of 1.72-cm Undulators in 30-ID



Calculated flux spectra near 23.7 keV of the 1.72-cm period undulator

Courtesy: Roger Dejus



Liquid Nitrogen Distribution System Improvements

Two new super-sized LN2 tanks installed at 434 and 435, during the April-May maintenance shutdown.



Before - 3000 Gallon tank at 434



After - 9000 Gallon tank at 434

Benefits of Tank and PLC Upgrades

The increased tank capacity reduces the number of deliveries needed, thus reducing the potential for delivery failures.

	Tank Capacity	Module B	Module C
Fills March 2014	3000	30	33
Fills June 2014	9000	5	7

One of the programming features of the new PLCs is an "Auto Recovery" routine. Auto Recovery opens up an Electric Keep Full valve to vent off excess gaseous N₂, which helps prevent beamline drop valves from closing.

	Number Of Closes	Duration of Closes in Minutes	Average
March 2013	30	2 to 53	19 minutes
March 2014	3	5 to 8	6.3 minutes



Future Plans for Improvements

1. The following are funding dependent:

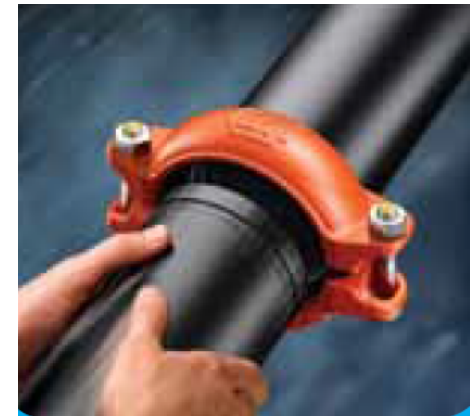
- Installing additional automatic keep full valves to keep dead legs full of LN₂
- Purge valves to purge dead legs of gas and contamination prior to opening the interconnect valves
- Extending the control system for the purge valves

2. A longer term possibility is:

- Consolidating the two 3,000-gallon tanks at 432 into one 9,000-gallon tank. This would save on monthly leasing costs, reduce the frequency of fills, and provide additional buffer capacity.

APS Low Temperature Heating Water System

- System provides heating for the majority of the 400 area including technical systems.
- Piping is a mechanically coupled system consisting of elastomer gaskets and ductile iron housings.
 - We operate well within the gasket manufacture's recommended operating range.



Piping Gasket Failures - Historical Background

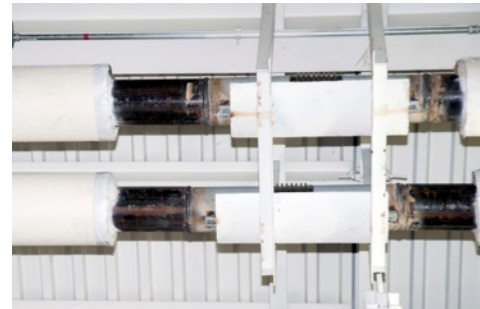
- Gasket failures on the hot side of the system were noted in the late 1990's and occurred when system pressure and temperature were relaxed for maintenance operations.
- The manufacturer was notified and the cause was identified by Argonne to be gasket embrittlement and loss of elasticity due to temperature.
 - Further investigation by Argonne found that this was an industry wide problem traced back to improper curing of the EPDM gasket material.
- Argonne procurement negotiated a repair plan with the manufacturer that included replacement of all the gaskets that had failed at that time with new more robust gaskets.
 - These new, more robust, gaskets have been in place since 2002 and we have not had any reported failures to date.

Piping System Ongoing Repairs

- Subsequent to the initial repair, additional failures have occurred in original gaskets on the lower temperature side of the system.
 - These have been addressed during maintenance shutdown periods
 - Approximately 40 percent of the systems joints have been remediated to date.



Original Pipe Joints



Remediated Pipe Joints (showing welded connections)

- The total number of leaks reported during the recent heating system disruption was 65 (less than 5 % of the total system joints).
- This was many more than expected. An APS engineer was on-site over night, when the system was shut down, to identify leaks and mitigate problems.

Path Forward

- Replacement and repairs will continue until all the existing joints have been remediated.
- This activity will take place during spring and summer shutdown periods.
- To accelerate the effectiveness of this activity, areas with leaks identified during this past shutdown will be given a priority for remediation.
 - Earliest possible plans for completion are October 2015, if funding is available.

Summary

- Accelerator continues to deliver outstanding performance
- Decisions to be made on the Liquid Nitrogen Distribution System
- Repairs to Low Temperature Hot Water Supply ongoing
- Successfully installed 1.72-cm period undulators in 30-ID